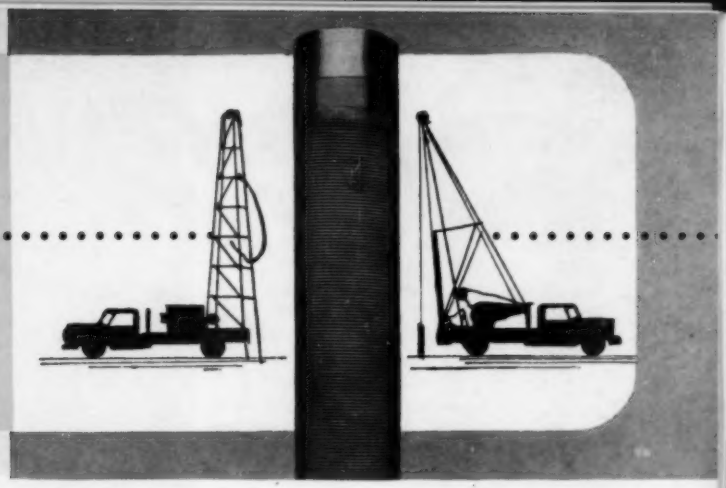
The Johnson National DRILLERS JOURNAL



vol. 26 • no. 2

MAKING a half-century count for better wells with JOHNSON WELL SCREENS

The railroad station-master looked out through the observation window at the big man dressed in khaki trousers, knee-high boots, lumberjack's shirt and mackinaw, who was pacing slowly up and down the platform waiting for the afternoon local freight to show up. It was a chilly day in early February, 1904. The wind was coming in stiff gusts across the western Minnesota prairie and the thermometer hovered about the freezing mark. Obviously, this man had more on his mind than the impatience he felt toward the long delay. Waiting for local freight trains that ignored all schedules was an old story for him. He had been trying to outguess them for many months.

"Ed Johnson sure was burned up over that telegram he got this morning," the station-master said to the drayman. "He ate his lunch this noon without saying a dozen words. Must be cooking something up in that head of his."

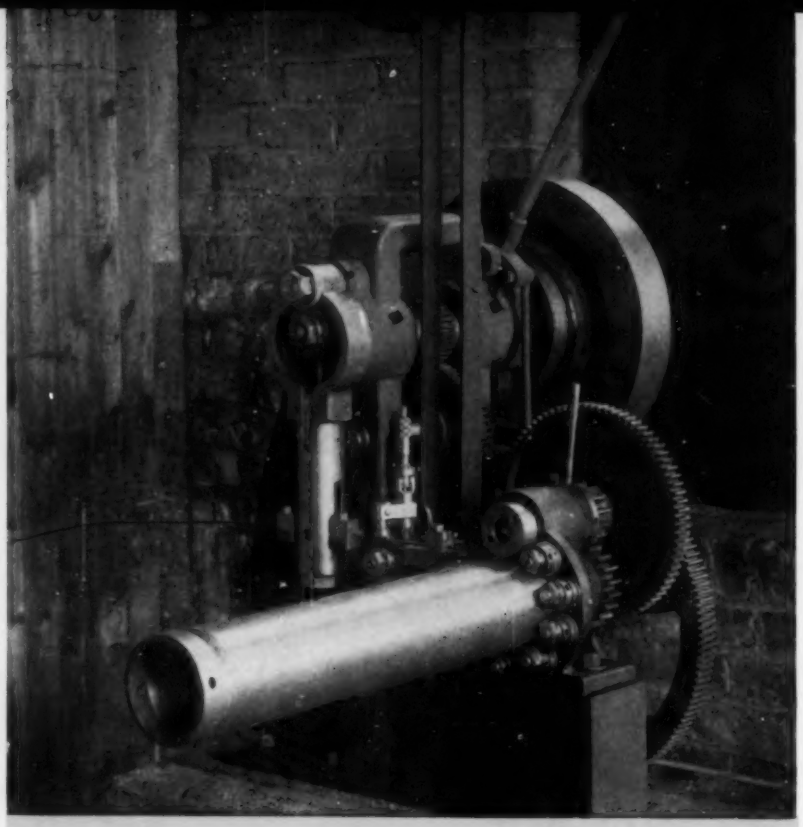
"What was so bad about the telegram?" asked the drayman.

Fiftieth Anniversary
Edward E. Johnson, Incorporated
March — April 1954

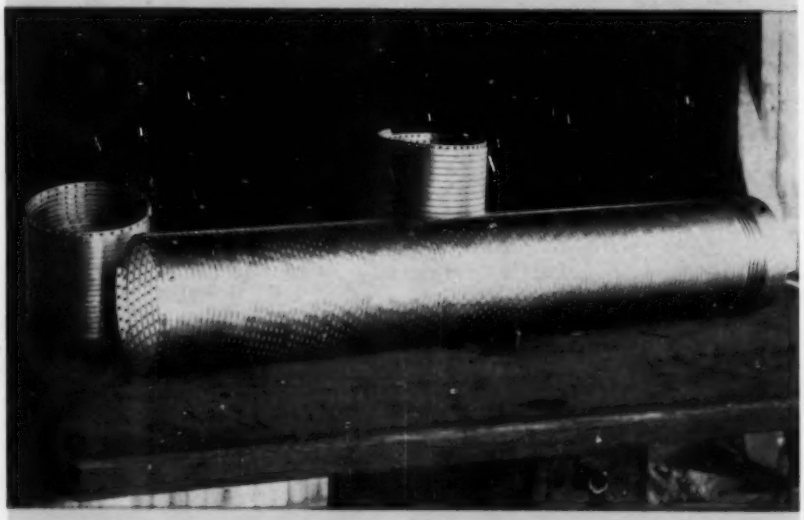
"Well, seems like Ed had ordered a big well point from some place for the new well here at the junction. It was supposed to be here last week and when he wired about it today he got a telegram back saying it wouldn't be shipped for another week. He's had his rig tied up close to a month now. I asked Ed why he didn't make one up for himself—I saw the one he put in the other well and it didn't look like it would be much of a job for him to make one like it. But he says, 'Nope! If I ever make one, it will be something different and better. Any fool can copy somebody else's idea. The thing that makes me mad,' he said, 'is when I see how much blank space I get. You don't get any water out of blank tubing. I've got some ideas, and one of these days I'm going to come up with a well screen that will have a lot more open space for the water to come through'."

When the freight pulled in, Ed Johnson greeted the conductor and brakeman, climbed into the caboose, made himself as comfortable as he could in one of the hard seats, and promptly pulled out a pad of paper from his satchel. While the caboose stood on the sidetrack during the switching operations and the long wait for No. 202, he proceeded to cover sheet after sheet with sketches and figures.

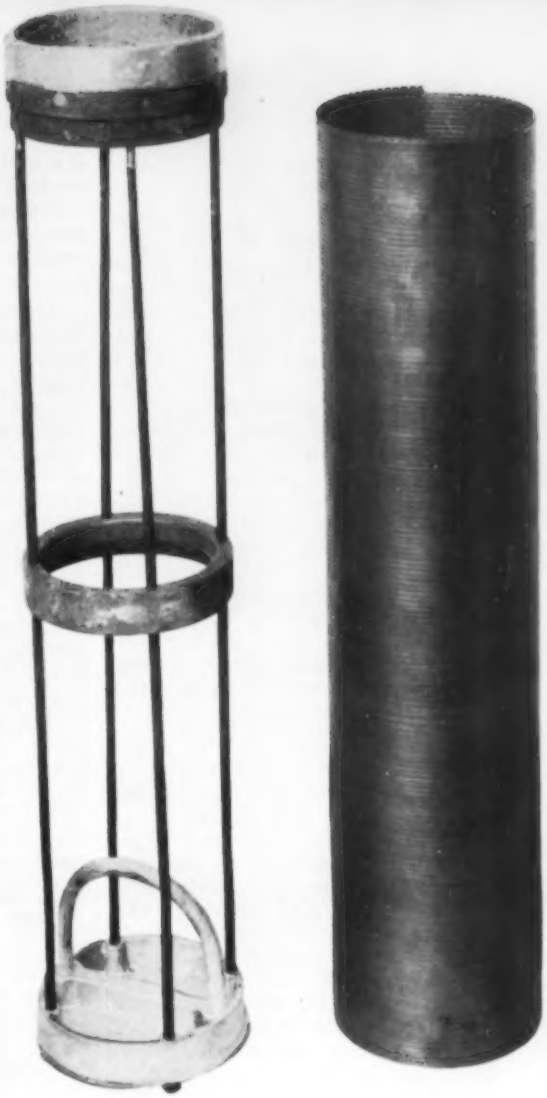
Yes! He was giving form to some ideas that had been gradually developing in his mind for a long time—ideas for a radically different kind of well screen—one which he firmly believed would be better. He visualized a screen with continuous, V-shaped, slot openings—in contrast to slots punched or sawed through the wall of a tube. His idea was to form the screen by winding a special-shaped brass strip helically, interlocking the adjacent turns of the strip to each other to make a rigid cylinder. The brass strip was to have an extended lip on one face so that continuous slot openings on the surface of the cylinder would be left between these lips on adjacent turns of the helix. The width of the slot openings was to be varied by trimming the edge of the lip of the brass shape as required.



This machine made the first Johnson Well Screen in 1904. The special-shaped brass strip was trimmed and punched as it entered the machine from the left to be wound helically to form the screen. Each turn was locked to the preceding one to make the screen into a rigid cylinder. This machine could make well screens from 3 inches to 12 inches in diameter, in sections up to 12 feet long. The same special-shaped brass strip was used for all the sizes in this range. In later years, material of heavier cross-section was obtained for making larger diameter screens.



Specimen pieces of Johnson Well Screen made from the first of the special brass shape produced. Note how the outer lip on the brass strip formed the continuous slot openings between adjacent turns of the strip. This lip was undercut to give the slot opening a V shape, widening inwardly. To vary the slot size the edge of the lip was trimmed back as required to leave the desired width of opening.



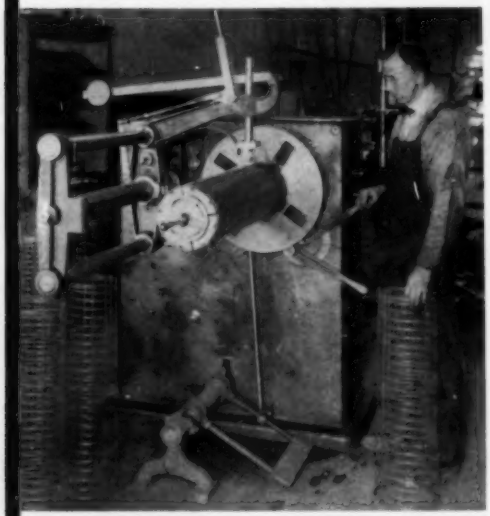
First screens had skeletons of steel rods to hold end fittings. Galvanic corrosion resulted from use of brass and steel together. Later, longitudinal rods made of brass were employed.

The reason for making the slot openings continuous was to get more open area per foot of screen to let more water into the well. Another important feature of the design was to make screens of several different diameters and a fairly broad range of slot sizes from a single extruded or cold-drawn brass strip. Doing this would eliminate the problem faced by other screen manufacturers in keeping stocks of many different sizes of brass tubes.

When the train got under way, with the caboose jerking and jogging about, he closed his eyes and gave more thought to the details of his idea. When the caboose was at rest at each station, he would revise his sketches and his figures. By the end of the trip, he had in his satchel the basic design from which he produced the well screen which bears his name and which was destined to become known all over the world.

In a nutshell, that is the story of the birth of the Johnson Well Screen; but it is far from the whole story. Behind it lay years of thought and experience; and beyond it were years of struggle, study and improvement.

Just who was this man, Edward E. Johnson? What was his background that led him to do these things?



Experimental work in 1930 with various welding processes in the search for the right method to produce Johnson Screens of all-welded construction. Shown here is one of the early pieces of equipment used to check the effect of various welding currents and different speeds of welding.

At the time this story started, he was in his thirty-ninth year. He had been reared in an austere but scholarly atmosphere. He received his Bachelor of Science degree from Worcester Polytechnic Institute when he was only nineteen. His first jobs were as a surveyor; but he soon moved into the rapidly expanding field of water supply engineering. He worked as a designer and sales engineer for several manufacturers and builders in this field.

In 1899, he was resident engineer on the new water works for the City of Rock Island. Daniel W. Mead, one of the world's best known hydrologists and hydraulic engineers, was the consulting engineer on the project. Here was formed a friendship between two distinguished men in the water supply field which lasted a lifetime.

Not long after this work was completed, Mr. Johnson struck out for himself as a contractor specializing in railroad and municipal water supplies. His wide and favorable acquaintance with water supply engineers in these fields stood him in good stead. They were glad to turn their headaches over to a man whom they knew to be able and honest. He was kept very busy, especially in well drilling, to meet the expanding needs of railroads and municipalities. Wherever he could, he subcontracted the drilling work to established drillers who met his standards of workmanship. Where such men were not available, he operated his own crews.

The work kept him on the road most of the time going from job to job—usually on freight trains along with various pieces of equipment he was moving from one job to the next. It was on such a move that this little history began.

Edward E. Johnson faced his first tough hurdle when he looked for a brass mill to produce the specially-shaped material he required. Every mill he approached came back with the same answer —existing methods could not produce this complex shape. Finally, the engineering division of one of the mills, now the American Brass Company, agreed to study the problem, starting from scratch, if Mr. Johnson would spend his time with them to give his suggestions and to consider any proposed modifications. He promptly put his affairs in order for an extended absence

and headed for the mill at Waterbury, Connecticut.

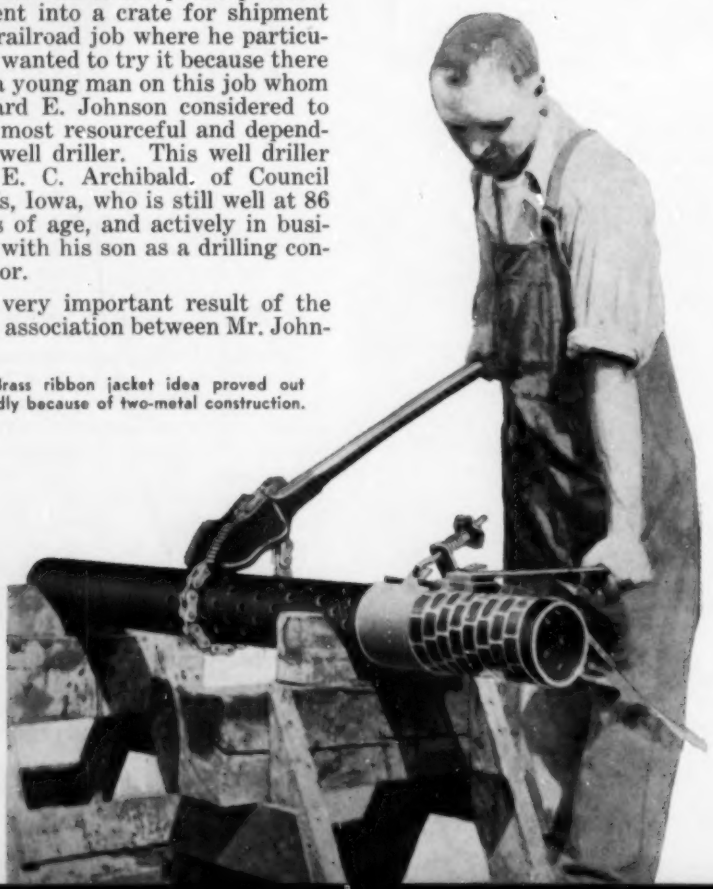
Here he found a group of alert, energetic engineers and mill technicians who were willing to tackle an impossible problem and try to lick it. A few weeks later, a workable solution was found. Mr. Johnson came home with mixed emotions. He was delighted because he would soon have the first mill-produced, special-shaped, brass strip for his product. This elation was tempered, however, by the fact that the mill could not form exactly the shape he needed and he had to find a way to perform two mechanical operations which would complete the strip for use in making a well screen. By the time he was back in St. Paul, he had the idea fully sketched for modifying his original machine to include the necessary operations.

Every spare hour beyond those he begrudgingly gave for sleeping and eating was used in building his machine. The first shipment of cold-drawn brass strip arrived at about the same time as the machine was set to go. Amazingly, the first screen that came off the machine was an acceptable product. It went into a crate for shipment to a railroad job where he particularly wanted to try it because there was a young man on this job whom Edward E. Johnson considered to be a most resourceful and dependable well driller. This well driller was E. C. Archibald. of Council Bluffs, Iowa, who is still well at 86 years of age, and actively in business with his son as a drilling contractor.

A very important result of the close association between Mr. Johnson and Mr. Archibald was the increased acceptance of the idea of "developing" wells finished in sand and gravel formations. Each in his own field did much toward pioneering this concept.

Among the first inquiries for Johnson Well Screens in 1905 were letters from Crane Company of Omaha, Artesian Well & Supply Co. of Providence, and Sydnor Pump & Well Co. of Richmond. Fairbanks-Morse carried the first ad illustrating the new screen in a catalog late that year.

Being an inventor, Mr. Johnson was always coming up with new ideas. One of these was the manufacture of a slotted brass ribbon that well drillers could wind on perforated pipe to make their own screens. The ribbon had V-shaped slot openings. Various sizes of openings from .010" to .050" were made. This idea enjoyed some use but was discontinued after a short time because it had two weaknesses found in pipe-base screens. The dissimilar metals, brass and steel, brought about trouble with electrolytic corrosion; and the perforated pipe interfered with the functioning of the screen, greatly reducing its efficiency. All pipe-base screens have these deficiences.



Brass ribbon jacket idea proved out badly because of two-metal construction.

First all-welded Johnson Screen in 1931 with W. M. Bollenbach, now president of the firm, on the job to see it set in a truck gardener's well near St. Paul. The screen is still in service.

Mr. Johnson was critical of his own products. He was constantly looking for better designs, methods and materials. This critical searching resulted in many changes which were adopted as the years passed by. To help in conducting all the phases of his business he added key men to his staff from time to time. One of the first of these was Albert A. Jens, who was employed as superintendent in 1911.

The same year saw the construction of a large addition to the original 40′ x 40′ Johnson manufacturing plant at its present location. Mr. Jens continued as superintendent up to the time of his death in 1953 through 42 years of happy association with the company. He was not only an able plant mechanic but also an ingenious man in working out devices and methods. Together, Mr. Johnson and Mr. Jens worked their way through many production problems. It is interesting to note that Mr. Jens' son, a graduate engineer, succeeded him as superintendent after having worked as his father's assistant for some ten years.

Mr. Johnson's own son, Donald, played an important part in the development of the company from

1913 to about 1928. By handling almost all the administrative and sales work, he left his father free to concentrate on production and research. Misfortune struck when Donald Johnson fell victim to a fatal disease which incapacitated him for years and resulted in his death in 1934.

In 1928, Mr. Johnson employed W. M. Bollenbach to take over the administrative direction of the business. Together, these two men directed the company into a broad program of product development and sales promotion. This program was based on combining constant product improvement with a highly specialized service to well drillers and well owners that was to reach far beyond selling well screens. It was to cover every aspect of ground water development. It became a continuing search for better methods, more accurate field and laboratory determinations, and longer lasting construction. The knowledge thus obtained has been spread throughout the industry, using such means as technical bulletins and the Johnson National Drillers' Journal.

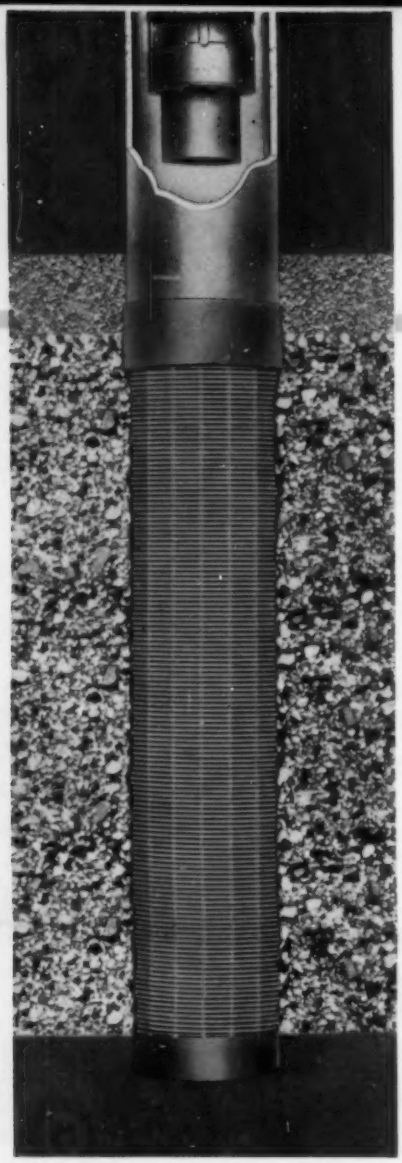
The widespread use of electric welding and its rapid development in the late 1920's led Mr. Johnson's fruitful mind to dream up a new well screen of all-welded construction.

The American Brass Company had just brought out Everdur metal, a new copper alloy that could be resistance-welded. Stronger and more corrosion-resistant than brass, Everdur fitted all the requirements of the new screen. He spent months designing the cold-drawn wire shapes that had to be welded at thousands of points to make the screen. Many more months went into drawings and ex-

(Continued on Page 12)

The Johnson Welded Well Screen of today, the result of 50 years of specialized experience.

The present manufacturing plant of Edward E. Johnson, Incorporated, 2304 Long Avenue, St. Paul, Minnesota.



A significant improvement in ground water supplies from wells in sand and gravel formations has resulted from increased knowledge regarding the proper development of such wells. Efficient well screens are required, properly designed and correctly fitted to the sand and gravel in each well.

A properly screened and developed well will yield more water. It is also much safer from such troubles as sand-pumping. The result of knowledge accumulated largely over the past 50 years has been to eliminate most of the guesswork in screen selection and the construction of screened wells.

The wells are "developed" by suitable means, using surge plungers, compressed air, or backwashing to produce a natural filter of more permeable sand and gravel around the screen, like that shown in this photograph. To attain this result, it is necessary for the well screen to have the largest possible area of non-clogging inlet openings so that the silt and fine sand can be thoroughly and uniformly removed from the formation.

Selecting Well Screens— Then and Now

The 50 years during which Johnson Well Screens have been in use have seen a decided change in the basis for selecting a screen to fit the sand of a water-bearing formation. The practice in the early part of the century was to use as fine a screen as possible. This was believed necessary to insure sand-free wells. Sand-pumping was a major problem since the deep well pumps of those days were mainly plunger pumps. Leathers wore rapidly, valves leaked and other problems faced the owner or operator whose well yielded even a small amount of sand.

Slot openings of .006" to .012" were commonly selected sizes and gauze-covered screens were usually No. 50 to No. 100 mesh. These fine screens held out about 90 per cent of the formation sand, in most cases.

Once in a while, a well would turn out to be a "sand pumper" when, by accident, a screen was used that held out less (perhaps two-thirds) of the formation sand. Mr. E. C. Archibald, the first well driller to use Johnson Well Screens, and Mr. Johnson both observed that such wells cleared up after a period of use and, when they did become sand-free, they were much better wells. This observation led both men to think seriously about how to use coarser well screens to make better wells. Following up the idea, Mr. Archibald began selecting screens with larger slot openings for his jobs. He also experimented with various means of moving the finer sand into the screen, then bailing the sand out before installing the well pump. He tried a variation of "swabbing" by working a swab up and down in the well rather than using the swab as a suction device as was common practice in oil well work. He found that surging with the swab brought in more sand which he then bailed out of the well. He also found that, after surging, the well would clear up quickly when pumped and would remain sand-free.

This operation of removing the finer particles of sand from the formation began to be called "development" work. Gradually the idea caught hold and spread among well drillers. By 1930, most Johnson Well Screens were being made

with slot openings that held out only one-half to two-thirds of the formation sand. "Developing" the formation had become an important part of the work of completing a screened well.

It should be noted that a well screen with non-clogging openings is needed to permit successful development. A considerable quantity of sand must be brought through the screen without plugging it. The importance of V-shaped openings, widening inwardly, had been recognized long before the idea of development came along. The brass tubular well screens being used even before 1900 were made with V-shaped openings.

For a period of several years, beginning about 1929, Edward E.

Johnson, Inc., concentrated its technical efforts on laboratory and field work to try to find the best methods of well development. These studies brought about many improvements in methods and more widespread acceptance of the modern conception of developing wells in sand and gravel formations. A sounder basis for selecting the size of screen openings corresponding to the grading of the formation was worked out. It was found that still coarser screens could be used to improve results, without danger of sand-pumping, if accurate samples of the water-bearing sand were tested and the screen selected scientifically. Screen slot openings are now commonly used which retain only 25 to 40 per cent of the sand, following established principles to guide the determination in each case.

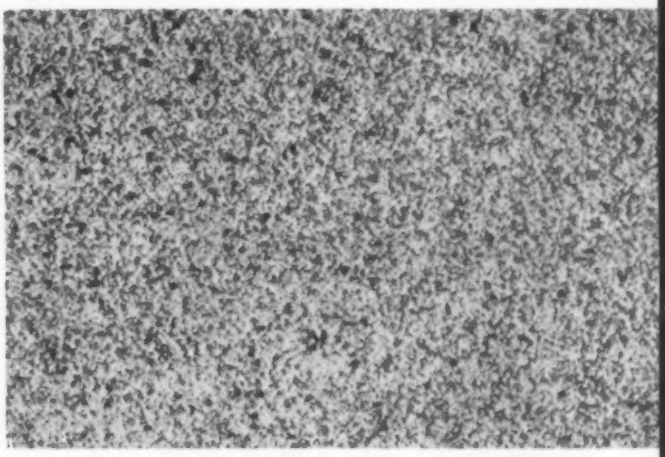
Many drilling contractors contributed to improving development techniques over the years. They experimented with various kinds of surge plungers, with the use of compressed air and with different methods of backwashing. Much credit is due these drillers. They have all added importantly to the practical methods now in use.

A major result of this work has been to greatly increase the yield and life of screened wells. Most of the guesswork has been eliminated from the work of constructing such wells. This, in turn, has resulted in changing the preference for so-called "deep rock wells." Due to the early difficulties and uncertainties involved in obtaining good performance from wells in sand and gravel formations, deep rock wells used to be considered the most desirable sources of well water. Actually, ground water from sand and gravel formations is usually more abundant, is cooler, contains less minerals in solution, and can be pumped at lower cost.

The last few years have seen the use of chemical treatment to assist in developing screened wells. Certain glassy phosphate compounds, when dissolved and agitated in the well, cause dispersion of clay and silt that may be in the water-bearing sand. Such dispersion or loosening of the clay and silt makes it much easier for the mechanical operations to remove these fine materials from the formation around the screen.

Choosing the right metal for a well screen is another important factor in screen selection. Welding as a means of fabrication has made it practical to manufacture well screens of many different metals. This provides a wide range of selection to meet the problem presented By waters of different corrosive characteristics. By analyzing the water from a given formation, the metal best suited to the situation can be selected.

Today's practice in well screen selection includes, in addition to determining the proper slot openings and choosing the right metal, careful consideration of the diameter, length and setting of the screen. All these factors, plus a knowledge of drilling techniques and of ground-water hydraulics, are involved in the scientific application of well screens for better well construction.

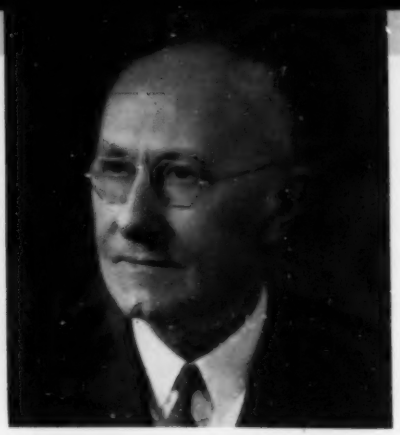


Left: E. C. Archibald, now 86 years old, who installed the first Johnson Well Screen in 1904. He has used hundreds more during the 65 years that he has been a well driller.

Center: In 1904, a 20-slot screen would probably have been used in a sand and gravel formation like this. Today a 100-slot screen would be used, and the well developed to improve its yield and to make it sand-free. About 60 per cent of the particles of this formation are finer than No. 100 slot openings. The "developed" zone around the screen becomes stabilized as the finer particles are removed from it.

Right: A 6-slot screen would have been chosen for this fine sand in 1904. Today, a 15-slot screen is known to be best for this formation. Although this formation contains no coarse material as seen in the preceding photograph, it can and should be developed. About 50 per cent of this sand will pass a No. 15 slot screen.

EDWARD E. JOHNSON, *Founder*



Edward Everett Johnson was born on November 25, 1864, at Rockford, Illinois. After graduation from high school, Mr. Johnson entered Worcester Polytechnic Institute at Worcester, Massachusetts, and received his engineering degree in 1884.

The first few years following graduation he spent doing surveying and field engineering. From 1889 to 1893 he was a designer and sales engineer for Goulds Manufacturing Company; then went to Henion and Hubbell of Chicago.

In 1899, he was selected to be resident engineer on the new water supply system at Rock Island, Illinois. Upon completing this job, he did contracting for railroad water supplies and municipal filtration plants. While engaged in this work, he conceived his first design of an improved type of well screen in 1904.

He started manufacturing the Johnson Well Screen as soon as he had worked out production problems. As the years passed and his business expanded, he surrounded himself with men who best fit into his long-range plan and whom he could train to work out his ideas with him. The fact that his company has become internationally recognized as the leader in its field is a tribute to his ingenuity and foresight.

Mr. Johnson was an engineer of high attainments, an inventor of exceptional ability, and a businessman of unquestioned honesty. Above all, he had a broad and charming personality. He was a man who knew the finest literature; whose mastery of the English language was a remarkable accomplishment; whose breadth of view was a source of pleasure to those who conversed with him. He was both a practical and successful engineer and a man of highly-developed cultural achievements.

...and W. M. BOLLENBACH, *President*

Willard M. Bollenbach was born in Luverne, Minnesota, on December 5, 1897. After attending local schools, he enrolled at the University of Minnesota, from which he graduated in 1920. He then entered the banking profession at Lamberton, Minnesota.

In 1928, Edward E. Johnson asked him to join the firm to take over sales and administrative duties. Mr. Bollenbach later became vice-president of the company and then succeeded to the position of president in 1937, following Mr. Johnson's death.

As a result of Mr. Bollenbach's business training and intuition, combined with Mr. Johnson's engineering skill, the company emerged from the great economic depression of the 30's in strong condition. He launched the Johnson National Drillers' Journal in 1929, with the idea that through such a publication the company could contribute much in the whole field of ground water development.

A program of product improvement and research was expanded under Mr. Bollenbach's direction, with the result that by the end of World War II the company was the leader in the well screen industry.

A standard practice of the company which Mr. Bollenbach insists on following is to prove in the field the ideas developed from experimental work in the laboratory. A new idea is good only after it has been proved good on the job.

Mr. Bollenbach projects his personality into everything he does. He has inspired his associates by giving them dynamic leadership. He has always believed in keeping his thinking clear and practical through personal contacts with well drilling contractors, materials suppliers, engineers, and geologists. To accomplish this he has travelled extensively for the company and has interviewed thousands of people all over the world. As a result, he has acquired an amazing roster of friends in the United States and in a score of other countries. His wide acquaintance among well drillers is a source of much personal pleasure.

His guiding principle in business is constant progress. Plans for the company have been extended well into the future. Under his policies and guidance the company is proceeding into its second half-century an alert and vigorous organization, always searching for improved products and better methods of well construction.

TOM'S COLUMN

At left: Drilling a 16-inch well and setting a Johnson Well Screen for the Roxana Petroleum Co. about 1920. The 4-post wood derrick had to be erected at each well site. Steam rigs were still being used at this date.

Below: Device for transmitting "horse-power" to a drilling machine and how it was used to drive a jetting machine. These are reproductions from a catalog of well supplies of 50 years ago. (Illustrations courtesy R. R. Howell Co. of Minneapolis.)

EVOLUTION OF DRILLING METHODS

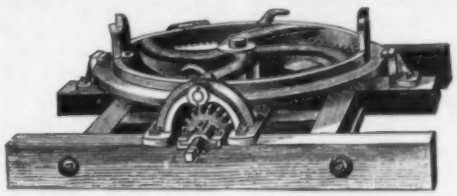
There's something extra special about a Golden Anniversary—whether it's for a weddin' or a company that's made th' grade. I remember when I was a kid I used to think the ol' folks was crazy when they said how it seemed like only a short time when they looked back 30, 40, 50 years. Like ev'ry youngster, I thought it looked a long ways ahead to talk 'bout 50 years. But now I find myself lookin' back an' sayin' th' same thing—"Seems like just yesterday."

My first contact with Mr. Johnson an' his screen was back a good part of that time—35 years or so. I still remember it. I had heard 'bout his screen that was such a clever piece of fabrication an' how it got a lot o' water from a sand well. In them days I was scared to death of any well point coarser than a 50 gauze, an' when I saw th' slot size that Mr. Johnson said I ought to use on th' creamery well I went to see him about, I darn near fell on my face. I don't remember what it was—but it was probably only a No. 20 or 30 slot and held out 'round half or two-thirds of th' sand. He had to do some sellin' to get me to put it in. Told me to do a lot of stirring up with as big a bailer as I could run into th' screen so as to loosen up th' sand an' bail it out before clearing it up by pumping.

Anyhow, we put it in, did th' work as best we could, an' came out with th' best sand well we'd ever had. From there on, we quit being afraid of sand wells.

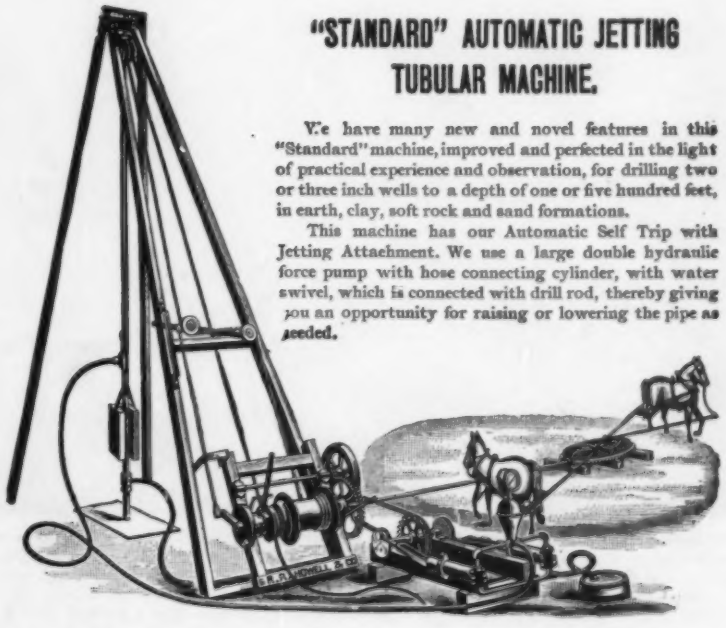
You know, men, there's been a lot o' changes take place in th' drilling business during these last 50 years. Let's jest take a little look back over our shoulders.

THE "WESTERN" TWO-HORSE POWER.



The above cut represents our "Western" two-horse power, which we guarantee to be the best, strongest, lightest running two-horse power adapted to run well machines in the market. It has no equal for this purpose, also for any other work that does not require high speed for one or two horses. Speed, 7½ revolutions of tumbling-rod to one of horses, and revolves over with the horses. When so ordered, we can furnish this power with pinion so as to give 9 speed. Fitted for 1¼-inch coupling.

Weight, complete, 600 lbs. Price.....$40.00



"STANDARD" AUTOMATIC JETTING TUBULAR MACHINE.

We have many new and novel features in this "Standard" machine, improved and perfected in the light of practical experience and observation, for drilling two or three inch wells to a depth of one or five hundred feet, in earth, clay, soft rock and sand formations.

This machine has our Automatic Self Trip with Jetting Attachment. We use a large double hydraulic force pump with hose connecting cylinder, with water swivel, which is connected with drill rod, thereby giving you an opportunity for raising or lowering the pipe as needed.

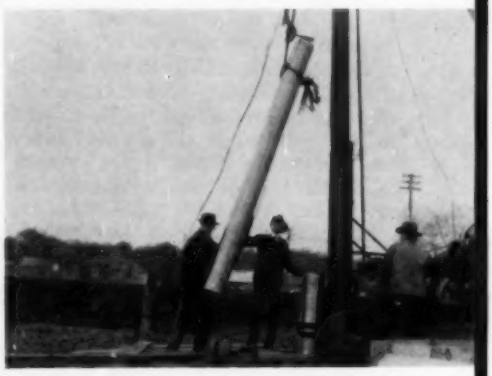
Th' first job I ever had in well drillin' was workin' fer a real old-timer on what we called a rope burner. It wasn't much more than a tripod with a cathead driven by a "two horse-power"—a gear outfit, turned around by two horses, that drove th' rig through what was called a tumbling rod. I started out takin' care of th' horses an' doin' odd jobs. Then, one day he let me work th' rope on th' cathead to lift an' drop th' drill rods. I darn near killed myself workin' before he finally busted out laughing an' then showed me how to handle th' rope so th' machine did all th' work an' what th' driller had to do was as easy as fallin' off a log. That was about my first lesson in how there's always two ways to do a job—right an' wrong, an' th' right way is usually th' easiest way.

Lots o' you men have used th' cathead for driving an' bumpin' pipe an' such jobs on up-to-date rigs; but I suppose there ain't many who have drilled wells that way. Maybe some o' you remember that they used to spud in their tools that way on the ol' "standard" drillin' rigs. It was regular practice to spud in this way an' not go onto th' walking beam an' temper-screw until you was down somethin' like two or three times th' length of your string o' tools.

Then I got a rig o' my own—if you could call it that. It might be nearer th' truth to call it a fugitive from th' junk pile. What a mess of loose bearings an' haywire that outfit was! It was quite a struggle to make common wages workin' with machinery like that, even in them days.

I was downright proud when I got me a second-hand rig that I bought "sight unseen." I did some letter writing about it with a well driller two counties away. You did more letter writing an' less running 'round in them days when nobody but th' banker an' th' doctor had a car. This driller said it was in good running condition with two strings o' tools all ready to go out on th' job—drill rope, bailer line an' everything. It was to cost me $250 cash on th' barrel-head for rig, tools, ropes an' odds an' ends, like wrenches, pipe lifters, and so on. That was a good chunk o' money in them days. My bank checked on him an' said he was O.K.; so I sent him $50 to hold th' deal an' scrambled around makin' collections fer th' next two weeks to get the other $200 to pay up.

Now I wouldn't call th' man a liar, but he was doggoned loose



Drillers installing one of the first 12-inch Johnson Well Screens about 45 years ago.

with th' truth when he said it was in good condition an' ready to go to work. I spent a hard week going over it before I took it out on a job. Before I went onto th' second job, I put new ropes on it. We drilled with manila rope in them days, o'course.

She was a cam an' treadle rig. Th' toe sheave was fastened onto a walking-beam that hit up against a bumper on th' frame when th' tools hit bottom. A crank with a roller on it came around against a steel wear-plate to push down th' beam an' lift th' tools. When it went past the end, th' beam was free an' dropped th' tools again. Many o' you men has run or seen 'em. Did a pretty good job o' drilling if you could live with th' danged thing an' keep it tightened up pretty fair. You could hear her running two townships away. Back then she was a good rig. Nowadays we wouldn't give it yard room.

My next machine had elliptic gears on it—quick drop an' slower pick up. Had a jetting pump on it,

Loading out a shipment of Johnson Well Screens from the factory onto a horse-drawn dray wagon in 1910. These screens were used in wells to supply water for the refinery of the Standard Oil Company at Wood River, Illinois. Three 12-inch screens, each 20 feet long, with No. 30 slot openings were included in this shipment. In all, eight 12-inch, 20-foot screens were installed in wells for this refinery during the year of 1910. A few years later a series of 18-inch wells were constructed. Additional wells have been added over the years to satisfy increased demand.

too, an' we put in some wells with rods but mostly with solid tools. Th' pump was a handy gadget to have on th' rig.

About then we had a little experience with what we called a "whirler." It was a light rotary fer shallow work. Did a good job in lots o' places but didn't fit our territory too good.

Later on we added a band-wheel rig. It was a good, dependable machine—still can do a job even if it is something over 25 years old.

Like all th' rest of th' drillers, we kept lookin' fer more speed an' convenience. We got a new compact rig, mounted on a truck. Handy to move an' to get into tight spots. Made lots o' hole an' made drilling a good bit easier all around. From there on in—especially th' last 15 years—it seems like there ain't been any let-up on getting more rigs an' equipment.

Now, as you look around at your own business and most of th' drillers you know, ain't that jest about th' story you see? It's all to th' good, too! We are all set up to get onto a job quick, put it down faster, an' get out of th' way in less time than we used to take makin' th' set-up in the ol' days.

Sure, it takes a lot bigger investment an' you've got to be more than a hole-pusher these days to keep on top. So what's wrong with that? It jest means that our business has grown up. It ain't no broken-down occupation where a strong back is all you need. It ain't jest a nice sideline for a farmer who doesn't like to milk cows. It's a grown-up business, boys, where you've got to use good equipment, good judgment, an' good methods to make a good income.

Look at what's happened in rotary rigs. Back 50 years ago rotary drillin' was a pretty new thing full of headaches. They was always twisting off drill pipes, or their old-type bits couldn't get d o w n through some hard stuff, or their mud pumps were kicking up, or a dozen other things was causing trouble. Have you seen 'em running these rigs of late? They're as different from the old-time rotaries as my newest cable-tool machine is from that first ol' cam-and-treadle rig. An' these new reverse rotary rigs. What a job they do when conditions are right fer them!

It really ain't so long ago that th' real deep well drillin' rig was the ol' "standard rig" with its big 4-poster derrick, and th' tools running off a temper-screw hung from a big walking-beam, usually run by a steam engine. We used to think some of th' holes they drilled with them rigs was really th' deepest things th' world would ever see. There used to be a lot o' yarns spun about 'em. Like th' ol' Texas driller who told me he drilled a hole so doggoned deep that he threw in th' hoist clutch to pull out th' tools, went home an' cleaned up, drove out to a dance, an' came back after th' last dog was hung, an' then had to wait 30 minutes fer th' tools to show up.

Anyhow, there's wells drilled nowadays so deep that they don't think they've got a good start until they're down below them deep wells we used to talk about in the ol' days.

Then look at all these other things we kind of take fer granted. Pipe is one of 'em. We used to have ten times as much grief with pipe as we do now. Part of th' reason is that th' pipe is better. They use better steel that is always th' same. Th' joints are better an' made to take a beating they never figured on 50 years ago. And us drillers have learned, too. We have improved our methods and are more careful in such things as makin' up clean joints and the like.

There's th' drillin' rope, too. Th' new rigs with their shock absorbers run a lot smoother an' faster an' longer with steel cable than we ever did with our ol' wood derricks an' manila rope. Look at th' size o' bull reel you had to have to reel th' rope fer a deep hole.

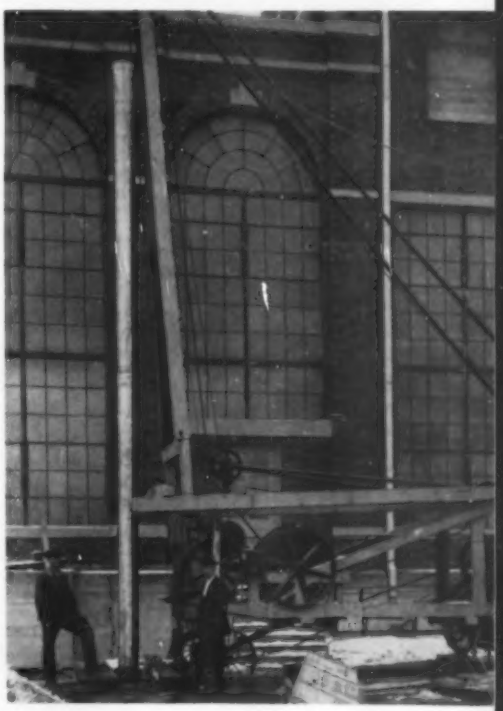
I've jest touched th' high spots; but when we look back we can see a whale of a lot o' progress all along th' line. Better methods, machines, equipment, well screens, etc. An' most important of all, we have better drillers to use all o' these improvements.

Let's not forget our partners—th' pump people. Man, oh man! What a change they've made in these years. When I saw th' first big two-stroke pump workin' I thought I'd seen th' final word. What a hunk o' machinery it was! Stood about 15 foot high an' filled th' best part of a good-sized pump house. And what a bruiser to install! There's been lots o' steps since then an' they're almost like th' steps from my ol' cam-and-treadle drillin' rig to my newest rig. We've improved, step by step, from clumsy to convenient, from low capacity to big capacity, from noisy to quiet running machinery, an' from hard labor to good head work.

I'd like to see what th' next 50 years bring. Wouldn't you?

Yer ol' friend,

TOM



Setting a large Johnson Screen at Muscatine, Iowa, more than 30 years ago. The drilling machine is typical of the cable tool drills of that day. A 12-inch screen, 20 feet long, with No. 60 slot openings was put in this well. Twenty-nine screens have since been installed in municipal wells at Muscatine.

Donald R. Johnson

Donald R. Johnson was born in Chicago, Illinois, on September 5, 1892. He was the eldest of three children and Edward E. Johnson's only son.

When Donald was nine years old, the family moved to Minnesota. He completed his public school education in St. Paul and then attended Vermont Academy, from which he was graduated in 1912.

He joined Edward E. Johnson on a full-time basis the following year. During the next four years he learned the business thoroughly, and in 1917 he was made vice-president. All administrative responsibility rested on his shoulders, for his father preferred to work on design and production problems.

About 1920 he became definitely aware of the first symptoms of a long illness which he bore courageously before finally succumbing. He continued his work without abatement. His courage was an inspiration to all who knew him. During the late twenties he came to his office and performed his duties in a wheel chair. Finally, in 1928, he was unable to carry on any longer and he retired from active participation in the management. Donald never lost contact with the business, however, and maintained his interest up to the time of his death on June 6, 1934, at the early age of 42 years.

50 Years in Well Screens

(Continued from Page 5)

periments with various types of machinery for forming the screen and welding it. A thousand headaches came between the design and successful production.

Welding experts were called in and consulted about details of how the welding could be done fast enough to produce screens at a practical rate. All were inclined to say, "it can't be done." But, after weeks and months of trying every idea they could think of, Mr. Johnson and Mr. Jens had the rare pleasure of showing the doubting experts a process that did the job. The scheme devised could produce perfect and uniform welded joints at a rate of 1800 welds per minute. Spacing of the outer turns of special-shaped wire that formed the screen could be held to an accuracy of plus or minus a thousandth of an inch. It couldn't be done—but it was done!

Fabrication by welding opened the way to further improvements in the well screen field. Screens can be made of any metal that can be resistance-welded. The list of these includes Everdur, various stainless steels, silicon red brass, pure nickel, monel, super-nickel, galvanized Armco iron, and galvanized low-carbon steel. Almost any degree of strength can be built into the screen by using heavier sections of the special-shaped members. This makes the welded screen safe for almost any depth of setting and method of installation.

In 1937, a little over six years after his invention of the all-welded screen, Mr. Johnson passed away. Mr. Bollenbach then became president of the firm. Under his direction, the company has constantly progressed until it enjoys world-wide recognition, not only for its products but for its specialized knowledge in the field of groundwater supply.

Included in the ranks of the present employees are many who have served for half or more of these fifty years. They take great pride in the product which they produce and in the organization of which they are an important part. To the ranks of the "old-timers" have been added many newer faces, including highly-trained men who are essential to continuing and extending the company's program of product improvement and research.

Fifty years is not a long period in the passage of time; but it is long and significant in certain fields of enterprise where greater progress has been recorded in these last fifty years than in ten times as many years before. The Johnson organization is proud of the company's part in this progress during this fruitful period. This pride does not stem so much from having successfully overcome the economic problems of a half-century, but rather from being able to look back at the contributions the company has made to industrial progress and public welfare.

Fifty years ago, when this company was founded, some of the very first steps toward modern groundwater development were being taken. Our purpose here has been to commemorate that time by telling how manufacturing and research have joined hands over the years with the ingenuity of well drillers, the work of engineers and the findings of geologists to bring groundwater development to the indispensable position it occupies today.

JOHNSON NATIONAL DRILLERS JOURNAL

50 YEARS 1904 1954

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W. M. Bollenbach ..... Business Manager
G. F. Briggs ..... Editor

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ASSOCIATION NEWS

This section is devoted to the exclusive use of water well drillers' associations, both state and local. Notices, announcements, changes of officers and other items should be sent to The Editor, Johnson National Drillers' Journal, 2304 Long Ave., St. Paul 14, Minnesota.

MINNESOTA

The Minnesota Water Well Contractors Association held its 32nd annual convention in Minneapolis on March 25-27. A number of topics on the program were of much interest to the membership, such as the geology of Minnesota, chemical treatment of wells, fishing tool problems, how to sell adequate capacity in wells, electrical hazards, dynamite usage, and information about "Blue Cross" health insurance.

Mr. E. W. Bennison of Edward E. Johnson, Inc., who recently returned from an assignment in India was prevailed upon to give some remarks on the hazards involved in foreign drilling work. Mr. Bennison, loaned to the United States Government to arbitrate contract disputes in a huge well drilling program in India, had four months of dealing with drilling firms from three countries and with the Indian Government. Although foreign contracts may appear large and attractive, he concluded that the stumbling blocks resulting from the methods of operation in foreign countries are enough to make it advisable to look long and hard before bidding on such proposals.

A crowd of 135 drillers attended the meeting. Good exhibits of materials and equipment added to the interest and character of the convention. The final event was the annual banquet and ball on Saturday evening, enjoyed by the nearly 300 people present.

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ONTARIO

The Ontario Water Well Association will hold its annual meeting and convention in the Oakville Arena, Oakville, on May 13 and 14. In addition to the business meeting of the Association, there will be informative talks, equipment demonstrations and entertainment.

Displays of materials and equipment will be set up by manufacturers and jobbers. This is the first convention of its kind for the water-well industry in Canada. The Association is bending every effort to make it a huge success.

—o—

NEBRASKA

The Nebraska Well Drillers Association continues to be one of the most active organizations in the country. At its recent annual conference and short course held at the University of Nebraska, 181 members were in attendance. Also, the representatives of 48 manufacturers and jobbers were present, and of these firms, 33 had exhibits on display.

All features of this twenty-third annual meeting, including the exhibits, the business meeting and the technical sessions, were very well planned and profitable to the members. The program included more talks than usual, but each speech was short and to the point. The highlight of the program was the talk given by Ivan D. Wood, irrigation specialist from Denver, Colorado, on "Engineering Aspects of Water Well Construction." The regular Dutch buffet supper put on by the manufacturers and jobbers was most enjoyable.

At the business session, the former vice-president, Erlo Cox of North Loup, was elected president; Arthur Haagaard of Ogallala was named vice-president. Andrew Olson, treasurer, and V. H. Dreeszen, secretary, were both re-elected. One new director, E. R. Horner of Ord, was named.

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SOUTH DAKOTA

The South Dakota Well Drillers Association held its annual convention at the St. Charles Hotel in Pierre on March 5 and 6.

Principal speaker at the convention was Governor Sigurd Anderson.

The convention unanimously approved a resolution to support legislation regarding well drilling which was proposed by the Governor. This is essentially a conservation measure, and provides for the licensing of all well drillers and the logging of all new wells.

Officers elected for the ensuing year are Irvin M. Johnson of Erwin, president; H. F. Draine of Sturgis, vice-president; Kermit B. Meier of White Lake, secretary; and Lloyd Hinker of Woonsocket, treasurer.

—o—

VIRGINIA

The annual meeting of the Virginia Association will be held in Winchester on May 7 and 8, just following the Apple Blossom Festival in Virginia. It will be a wonderful time to travel to this beautiful part of the state.

Welding 20-inch, 100-slot, Johnson Stainless Steel Well Screen to stainless steel pipe extension. Assembly was set in 36-inch hole, 112 feet deep, drilled by reverse-circulation and gravel-packed. Specific capacity of the completed well was 90 gpm per foot of drawdown when test-pumped at a rate of 3.0 million gallons per day.

ASSOCIATION NEWS

This meeting is a "must" for all water well drillers of the state. A fine meeting, with plenty of social activity, is planned. New officers will be elected.

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CONNECTICUT

The Connecticut Well Drillers Association holds monthly meetings at the Hotel Bond in Hartford. Carl V. Norcross of Ledyard is president for this year. Gene Bronzi, Torrington, is secretary and Staley Trask, Norwich, is treasurer.

This association took the initiative in looking into rates for public liability insurance on drilling machines. It started the ball rolling to get the rates brought into line with those on other construction equipment. With some help from the NWWA, insurance companies have been induced to classify drilling machines correctly rather than as motor transport vehicles. The result is a marked reduction in rates.

The association is now sponsoring legislation to regulate well drilling and license well drillers in Connecticut. One of the aims is to improve the standards of sanitary well construction.

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ILLINOIS

An almost record crowd of drillers, jobbers and manufacturers attended the 27th annual meeting of the Illinois Water Well Drillers' Association in Joliet on January 20 to 22. There was an excellent program of talks and a large number of interesting exhibits of materials and equipment.

At the business meeting the following officers were elected: Henry Boysen, Libertyville, president; John Anderson, Morris, vice-president; C. Leslie Johnson, Princeton, treasurer; and Robert Knodle, service secretary.

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IDAHO

Notice has been received that the Idaho State Drillers Association will hold its annual convention at Shore Lodge, McCall, Idaho, on June 28 and 29. It is anticipated that the convention will be the biggest and best ever held, and the early response from both well contractors and manufacturers backs up this belief.

Plan now to schedule yourself for an informative and constructive two days at Shore Lodge. A good time is guaranteed to all.

—o—

NEW ENGLAND

The annual meeting of the New England Water Well Drillers Association, Inc. was held at Concord, New Hampshire, on January 23. At this meeting, papers incorporating the organization were signed.

Stanley Hillock of Gorham, Maine and Ralph L. Gray of Southville, Massachusetts, who have been serving as president and secretary, were re-elected to their respective offices. Joe Dilks of East Longmeadow, Massachusetts was elected vice-president and Ray Drinkwater of Camden, Maine was elected treasurer.

Plans are in the making for a display by the Association at the Eastern States Exposition later this year.

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INDIANA

The 23rd annual convention of the Indiana Well Drilling Contractors took place in Indianapolis on February 25 and 26. An enthusiastic crowd of drillers, jobbers and manufacturers attended.

The exhibit rooms were crowded with fine displays that were of much interest to the drillers. The technical and business sessions of the meeting all were well attended.

An excellent smorgasbord supper was given by the Association the first evening. The annual banquet was the final event of the second day of the convention.

New officers elected for the year of 1954-55 are: Walter L. Gerdsen, Churubusco, president; Pete Bojrab, Fort Wayne, vice-president; Richard Hill, La Fontaine, secretary; and Mel Hahn, Nappanee, treasurer.

H. K. Carr of Greentown and Carl Heldt of Evansville were named new directors. Mrs. M. C. Hahn was selected as president of the ladies auxiliary group.

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NORTH DAKOTA

At Bismarck, in the War Memorial building, the 38th annual meeting of North Dakota Well Drillers Association was held on December 7 and 8. About 50 drillers were in attendance and a fine program was presented to them. Among the speakers were Art Williamson, North Dakota State Health Director, who gave an address on fluoridation, and T. N. Jorden, president of the North Dakota Oil and Gas Association.

The annual banquet was held in the Patterson Hotel. The film "Water, the Foundation of Life" was shown.

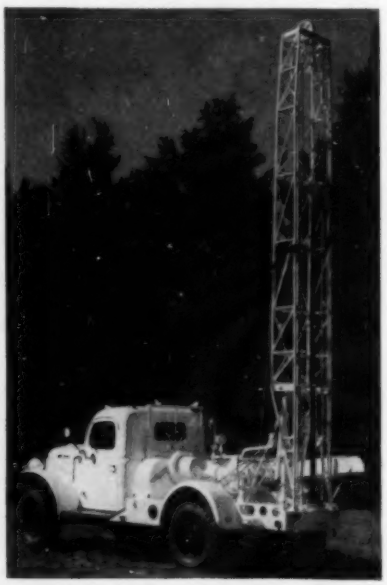
All of the present officers, Fred J. Simpson, president, Bisbee; John Bakken, vice-president, Wahpeton; and Fred V. Sletvold, secretary-treasurer, Oakes, were re-elected. One new director, Jim Krenelka of Kenmore, was named. The next annual convention will be held in Minot, December 5, 6 and 7, 1954.

—o—

IOWA

The Silver Anniversary convention of the Iowa Well Drillers Association will be held in Des Moines on May 28 and 29. The later date this year is a change from the last few meetings.

Details of the program and arrangements will be mailed to all drillers and others interested. Anyone wishing other information about the meeting may write Travis Parker, secretary, at West Branch.



Typical modern rotary drill for water well drilling of today.

ADVERTISEMENTS

We will insert advertisements for drilling equipment wanted or for sale, help or work wanted, etc., for our readers, free of charge. Advertisements must be brief, and we cannot assume responsibility for them, but will be glad to put parties in touch with each other by this means and suggest that they investigate any offers or inquiries carefully for themselves.

FOR SALE: Model B Cyclone, wood frame, mounted on 1934 model 2½-ton Dodge truck; machine and truck in good condition considering age. Both for $475. Harold Inman, R.D. 2, Jefferson, Ohio.

FOR SALE: Well drilling and pump business. Established concern. Selling because of husband's death. Write for equipment and tool lists and other details. Elizabeth Freeman, P. O. Box 2927, Orlando, Florida.

FOR SALE: Bucyrus-Erie 24L drilling machine, mounted on ten-wheel army truck. Good condition. Write: Libby & Freeman, P. O. Box 2927, Orlando, Florida.

FOR SALE: One jar bumper, long style, 4½" diameter with 3¼" fishing head. Price, $50, f.o.b. Reading. E. C. Lenhart, 2606 Philmay Terrace, Mt. Penn, Reading, Pennsylvania.

FOR SALE: Well drilling business. Will sell tools separately. Complete list furnished on request. Includes 6 H.P. kerosene engine, 300-lb. and 100-lb. drive blocks, 4" pump to mount on well machine. Priced at 50% of cost. L. Matteson, Tustin, Michigan.

FOR SALE: Complete rotary drilling machine, to make up to 36" underreamed wells; truck mounted; 100-ton hydraulic derrick; 180 H.P. Gardner-Denver 7¼ x 10 mud pump; 4½" drill pipe. Price, $25,000. Will sell without drill pipe and truck, if buyer wishes. American Drilling Company, 674 Branch Avenue, Little Silver, New Jersey.

FOR SALE: American Well Works turbine pump. A 10-inch, 14 stage, all-bronze pump, 200 gpm, 550' TDH; with 350' of 5" column pipe; water lubricated; new 50 H.P., 220-volt, 3-phase motor. Price $3,300 f.o.b. Liberty. Sullivan County Plumbing and Heating Supply Company, Inc., P. O. Box 549, Liberty, New York.

FOR SALE: Cyclone drilling machine, 1951 model, all steel; 5" jetting pump and clutch; Wisconsin VF4 engine with clutch; mounted on 1948 model 2-ton Ford truck. May be purchased with or without truck. Rodney Wieber, Box 211, Lidgerwood, North Dakota.

FOR SALE: One pair 4" x 6" Howell jetting pumps, complete with chains, sprockets, shafts, for mounting on drilling machine. All parts in A-1 shape. Price, $175. Erwin M. Johnson, Hawley, Minnesota.

FOR SALE: Well drilling and pump business established 50 years in good community, close to Albert Lea. Block building 25 x 50, lean-to 11 x 34, garage and warehouse 25 x 25, office and living quarters in block building. Selling business because of ill health. Hellie Real Estate, 203 South Washington, Albert Lea, Minnesota.

FOR SALE: New all-steel, hollow-rod, drilling machine, 28-foot mast; for 2", 3", and 4" work. Almost new, all-steel, cable-tool drill with 36-foot telescope mast; mounted on three-wheel trailer; for 3", 4", and 6" work. Ed Pluter, Route No. 1, Manistee, Michigan. Phone: 1345.

WANTED: Well driller to operate Model 50 Keystone or 22-W Bucyrus-Erie machine. Must know bit dressing. Plenty of jobs with good pay. Opportunity for experienced, sober man. Write: Twin State Well Company, Box 62, Bethel, Vermont.

WANTED TO BUY: Armstrong Model 45 drill without tools, if priced right. John Hamilton, Ellsworth, Wisconsin.

Plunger pump (right) of 35 years ago delivered 60 gallons per hour. Submersible pump beside it will produce 2950 gallons per hour.

WANTED TO BUY: Late model, medium-size, water-well drilling machine in A-1 condition. Prefer #40 or #42 Sanderson-Cyclone, with or without truck. Ralph Scott, R.R. 3, Pendleton, Indiana, Phone 294R.

FOR SALE: Bucyrus-Erie 24L, 1948, excellent condition with or without tools and lines; semi-mounted, 40-foot mast, power hoist, catheads, casing reels. Price bare machine $5,900. Complete with lines and tools $6,750. Max Toliver, Orleans, Indiana.

FOR SALE: Speed Star 240, two years old equipped with LeRoi engine, 30-foot derrick, cathead and double string of tools for 4" holes, 300 ft. of ⅝" drill cable and 500 ft. of ⅜" sand line; with or without 1950 Dodge truck. Duane C. Olson, R.R. 2, Box 93-A, Devils Lake, North Dakota.

WANTED TO BUY: Small rotary machine fully equipped for water wells and having reverse circulation. Prefer truck mounting. Max Toliver, Orleans, Indiana.

FOR SALE: No. 50 Keystone drilling machine, 1948 model, with 38-foot derrick, stiff braces, casing reel, blower, tool guide, 45 H.P. Continental engine one year old; 600' of ¾" drill line, 600' of ⅝" sand line, and 250' of ½" casing line. Power derrick raiser; oil shock absorber in derrick head. Machine in fine condition. Twin State Well Company, Box 62, Bethel, Vermont.

FOR SALE: Established well drilling business. Completely equipped. In prosperous eastern Nebraska. Mrs. H. B. Bruner, 1349 North Platte, Fremont, Nebraska.

WANTED: Used Bucyrus-Erie or Bucyrus-Armstrong drill, with drilling equipment for 600' to 1000' work. Give particulars and price first letter. J. B. Longstreet, Box 63, Matheson, Ontario, Canada.

FOR SALE: Peerless Hi-Lift pump, 30 gpm, 5 H.P. single-phase, approximately 250 ft. stainless steel shafting, used one week. Cost $2,000. Sell for $950. Located in New England. Marvin Ayre, Box 3191, Fort Lauderdale, Florida.

FOR SALE: No. 2 Clipper drill; on 5-ton, solid-tired, Biederman truck; 4-cylinder Leroi engine; 32' mast; new walking beam and temper screw for 2,000' capacity; complete string of tools, 1⅝ x 2⅝—7 A P I joint; drive clamps; 200' manila hemp drill line; and 300' of ⅝" sand line. Price $1,000. Skinner Bros., Route 5, Chillicothe, Ohio. Phone: 15-109.

FOR SALE: Keystone drilling machine, gasoline-powered, mounted on large wooden frame, hard rubber tires; other accessories. Goldbeck Drilling Company, 324 E. Hancock Street, Appleton, Wisconsin.

FOR SALE: Bucyrus-Armstrong drill Model 45W with calf reel, sand line, and 400' new ⅝" drill line; Bucyrus-Erie shock absorber. Mounted on semi-trailer. Price $1,000 with truck; $800 without truck. Claude Kramer, 15925 Loomis Avenue, Harvey, Illinois.

FOR SALE: Well drilling and pump business. One rotary drilling machine, truck mounted. One cable-tool drilling machine. Water truck, pipe truck, pick-up trucks and welding machine. Good warehouse and pipe yard on boulevard frontage, near town. Good stock of pipe, pumps and fittings. An established, sound business with records to show income. Selling on account of illness. Price, $20,000; includes equipment, inventory, property, and trade name. Located in mild climate of southern Georgia. T. R. Davis, 700 Mosley Street, Vidalia, Georgia.

WANTED TO BUY: Light-weight, pulling ring and slips for 18" and 20" pipe. Give price, weight and condition first letter. Riegler Water Well Drilling, Inc., 2190 Henry St., Muskegon, Michigan.

EVERYWHERE IN THE WORLD

Our Fiftieth *Anniversary*

EDWARD E. JOHNSON, INC.

THE OLDEST EXCLUSIVE MANUFACTURER OF WELL SCREENS

2304 LONG AVE., SAINT PAUL 14, MINNESOTA

The policies that have guided Edward E. Johnson, Inc., during its first half-century are well known, I feel sure, to almost every one in the water well field. They stem from the character and integrity of Edward E. Johnson, founder and president of the company for 33 years, and have influenced and directed the company since its beginning.

Mr. Johnson possessed the best attributes of an engineering education and a searching, inquisitive mind. It was his nature to tackle every job with the resolve to do it right--or not at all.

The company has followed the lines laid down by Mr. Johnson in 1904. It has continually strived to learn more about ground-water development from sand and gravel formations and the proper use of well screens. The considerable amount of information gathered in 50 years of manufacturing and research has been made available to the public.

As to the future, we will continue the policy of giving the well driller and the well owner the best to be had in permanent well construction. We expect further advances, for we will never cease our critical study of well-finishing, and our efforts to achieve more knowledge. Our desire, always, is to contribute all we can to the advancement of well construction.

We are genuinely grateful to our many friends throughout the world whose encouragement and suggestions have contributed so much. In a very real sense, our progress is the result of their help.

We look forward to serving you, in our second half-century, with our best in the fields of manufacturing and engineering.

Sincerely yours,

W. M. Bollenbach
President

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